

As regards the practical protection of fisheries, whether in sea or river, the case of the Americans is almost identical with our own; and the remedies to be adopted must be the same in both countries. As regards the scientific side of the question, relative to the habits and distribution of fish, there is much that is new and valuable in the Commissioner's report. Indeed, the greater share of the volume is devoted to such questions, and to the scientific classification, not only of fish proper, but of the various other forms of life found in the waters, and important as either providing food for the useful fishes or as preying upon them.

The various invertebrate animals which form the principal diet of fishes appear to exist in profusion, so that the scarcity of food-fishes cannot be attributed to the want of natural sustenance. Some of these animals which serve as a prey to fish when young, in their turn become aggressors when full grown. An interesting account is given of the destruction caused by various kinds of *Cephalopoda*, which commit great havoc amongst the schools of mackerel and herring. In attacking the mackerel "they would suddenly dart backward among the fish with the velocity of an arrow, and as suddenly turn obliquely to the right or left and seize a fish, which was almost instantly killed by a bite in the back of the neck with the sharp beaks;" and yet these same "squids," when young, themselves afford abundant and favourite food to fish.

The subject of sea-bottom is nowhere of such importance as where oysters exist, and Prof. Baird's researches on this point are most valuable. His remarks, which we have not space to quote in full, might be studied with advantage by those who are interested in oyster culture in England and in France.

Nearly 300 carefully executed engravings of the rare and more valuable forms of invertebrata conclude a volume of which but a faint outline has been given.

BALDWIN'S "IRISH FARMING"

Introduction to Irish Farming. By Thomas Baldwin, M.R.I.A., Superintendent of the Agricultural Department of National Education in Ireland, &c. (London: Macmillan & Co., 1874.)

IT is only by the spread of thorough technical education among our farmers that the most will ever be made of the comparatively small area which in these islands can be devoted to agricultural purposes; only by a scientific knowledge of the material with which he deals will the farmer be enabled to improve to the utmost the quantity and quality both of his crops and live stock. By careful selection and suitable feeding vast improvements have within recent years been made in the quality of the latter commodity, and by a scientific study of the various kinds of crops, of soils, and of manures, natural and artificial, rapid progress is being made in forcing "the earth to yield her increase" in greater and greater quantity and of richer and richer quality. No doubt as the reign of science becomes more and more universal, farming, like all other human pursuits, will be followed with more and more of skill founded on accurate scientific knowledge, and will become gradually less a matter of blind rule-of-thumb. In many instances this is the

case in Great Britain and in Ireland even now, many of our farmers bringing to bear upon their pursuit a knowledge of the results of the most extensive and exact scientific investigation. It will be long before such an intelligent knowledge becomes universal, we fear; and meantime such manuals as Mr. Baldwin's are of use in spreading among farmers, large and small, who have had no technical training in their occupation, a knowledge, conveyed in popular language, of what can be attained by scientific or skilled farming.

The work comprehends much in comparatively small compass. It treats first of manures, and the necessity of their application to supply the waste in the land caused by cropping. Without going deeply into the chemical properties of soils and manures, it affords plain directions which the unscientific man can clearly understand and appreciate; and considering the general character of the large class which the author essays to enlighten, he has taken the most efficient method for attaining his purpose. His remarks on farmyard manure are just, but he might have expressed his preference for covered yards more strongly, as, besides other advantages, these preserve the manure from rain-water; and, where fodder is in plenty, the liquid is absorbed and utilised in a way which it cannot be to equal advantage when applied by itself. It is well ascertained that dung made in such yards is much richer than in ordinary yards, as from being gradually compressed by the treading of the cattle the ammonia cannot escape, nor any appreciable waste occur. The author's estimate of the quantity of the manure made from one cow in the year at twelve tons is certainly too great if quality as well as quantity is desired.

The second chapter is devoted to the culture and management of green crops and cereals, including potatoes, carrots, turnips, mangold, &c., and the ordinary corn crops. Specific directions are given as to what kinds to sow on particular soils, and how to manage them in the fields and in storing them, each variety being specially referred to in its comparative productiveness and utility. The author's remarks on hay-making are well worthy of perusal. There is no crop so mismanaged as this, especially in Scotland, and considering its extent and value, no censure can be too strong on the negligence and want of skill so generally manifested in securing it.

The third chapter is devoted to live stock, and here the author seems to have studied the various phases of breeding and fattening with a practical eye. Ireland is peculiarly well fitted for rearing stock, and the yearly supply it affords to Great Britain is marvellous. With a moist climate and an alluvial soil, the Irish farmers possess facilities in their fresh swards and luxuriant green crops which we do not possess on this side of the Channel; until at all events we go across the Tweed, and not even there in sufficient breadth and measure, for permanent grass meadows are seldom to be seen. The quality of the various breeds of cattle and sheep is discussed; but it must be remarked that a great complaint on this side of the Channel is made as to the want of quality and growth in much of the supply afforded us; this is no doubt owing principally to the careless selection of breeders, and to too much indiscriminate crossing. The author's remarks on poultry deserve special attention, not

that he says anything peculiarly novel, but he treats the subject so plainly and in so much detail, that practical use can be made of his directions on a hitherto too much neglected point in rural economy.

In Chap. IV. examples are given of successful farming, both in large and small holdings, which all interested would do well to peruse. With industry and skill based on scientific knowledge, the productive power of the soil is astonishing. We see this more especially in the arid and sandy ground in Belgium, where two or three acres, produce is sufficient for the support of a family. Steam ploughing, no doubt, is an equivalent for spade husbandry in stirring and pulverising the soil, but the personal exertions and superintendence of the cottager in thorough tilling, in careful seeding, successive cropping, manuring, weeding, and harvesting, cannot be excelled or equalled in substantial production. There is, moreover, in Scotland at all events, a degree of comfort and healthy sturdy appearance among that class, now perhaps too limited in number, which bears a striking contrast to the beer-drinking artisan and his wan shrivelled children in towns.

The author concludes with a chapter on cottage-gardening, which may be profitably studied by those of more pretension than the mere cottager. In England the taste for decoration and utility in small gardening is much more manifest than in Scotland, where little else than Scotch kail and weeds are, as a rule, to be seen. Mr. Baldwin has, on the whole, done ample justice to the various subjects he has treated, while the scope of his work is sufficiently comprehensive for the guidance of those who need instruction; and most farmers do, be their rural occupation of small or large compass.

We hope that the spread of works of this class will pave the way for the general circulation among farmers of works of a much more technical and scientific kind, and that ere very long, through the exertions of the Agricultural Societies, both of England and Scotland, Agricultural Schools will be established in convenient centres both in England, Scotland, and Ireland, by means of which the British farmer will be at least on as good a footing as the farmer on the Continent of Europe and in America.

OUR BOOK SHELF

Elementary Dynamics, with numerous Examples. By W. G. Willson, M.A. (Calcutta: Thacker, Spink, and Co.)

Principles of Mechanics. By T. M. Goodeve, M.A. (Longmans' Text-books of Science.)

THE first work on our list does not aim at a novel exposition of principles, though it differs from the ordinary text-books in use amongst junior students. Notes originally put together by the author for the use of pass students of the Calcutta University have, after some considerable trial of their merits, been put together in the present form so as to embrace all the parts of the subjects which are generally treated of in text-books.

Mr. Willson is an ardent admirer of the works by Professors Thomson and Tait ("the magnificent treatise on Natural Philosophy," "the reader who wishes for further information on this subject (and on all such subjects) is recommended to consult," &c.), and his principal aim has been, we expect, to render the views of these distinguished writers more accessible to junior students. Knowing how liable authors are to go to pieces on the kinematic rocks,

we have gone as carefully as we could through the text, and it appears to us that the author not only understands his subject, but has manifested ability in presenting his material in a clear form to his readers. Dynamics he subdivides into statics and kinetics. In both these branches he adopts for unit of force the kinetic unit for which the pound avordupois is the unit of mass. We may remark in passing, that this is the only elementary book we know which goes fully and carefully into the subjects of the several units. Under the head of statics, the writer treats of force at a point, of parallel forces, of moments, of centre of gravity, resisting forces, machines, and of work and energy; under the head of kinematics, we have velocity, accelerated velocity, and kinematical principles and methods; under kinetics, we have dynamical laws and principles, the force of gravity (falling bodies, motion on an inclined plane, Attwood's machine, &c.), collision of bodies, and energy. On p. 130, the term *Roman* steelyard is derived from Rumán, an Arabic word for a pomegranate, "and the shape of the counterpoise seems to have given rise to the name." There are a great many examples, many very familiar to us, given at the end of the various chapters. The author apologises for imperfections in type and diagrams, but he need hardly have done so; we have seen worse diagrams in text-books got out nearer home. Some typographical blunders we have detected, but the context will enable a reader to correct them. The work has no index, is of a handy size, and gives one a favourable impression of the sort of training provided for the Calcutta students.

Mr. Goodeve's name is sufficient warrant for the accuracy and thoroughness of any work on mechanics that bears it on its title-page. His style is very lucid, and the accuracy and fulness of his knowledge of his subject enable him to give just sufficient explanation and yet not be too concise. He aims at a different class of students than that we have had to consider in the former part of our notice. These Text-books are designed for the "self-instruction of working men," and the two works by our present author in this series seem to us just fitted for them. In the work before us we are taken over a wide field. In an Introduction of sixty pages we have a miniature treatise, the representation of force, the gravitation measure of force, the laws of motion, and the meaning of the term energy, *inter alia*, are discussed. In the remaining twelve chapters most of the ground gone over in the first-noticed work is gone over rapidly here, and copious application of the principles is furnished by the description of a number of machines, the bare enumeration of the names of which would furnish an ordinary "Bookshelf" notice; in addition we have an account of the equilibrium and pressure of fluids and of gases, of the hydraulic press and hydraulic cranes, a chapter on girder beams and bridges, the strength of tubes and the catenary, all treated without reference (except in one or two places) to the calculus. We have much pleasure in commending this recent addition to the series, with its clear type and numerous and excellent diagrams, to all who take an interest in mechanical applications. There are many excellent exercises scattered throughout the work.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

The Degeneracy of Man

IN NATURE, vol. x. p. 147, Mr. Edward B. Tylor writes:—

"It would be well worth while if Dr. Peschel, from personal or published sources available to him, would settle once for all the question whether the great Bavarian ethnologist (Martius) continued through life the degenerationist that we in England suppose him to have been."